REMARKS

Reconsideration of the application is requested in view of the remarks below.

A. Rejections Under 35 USC 112, second paragraph

The Office action rejected Claims 3, 16, and 21 on the grounds that the term "short" lacked basis for comparison. In view of the modifications above, the rejection is believed overcome. Reconsideration is requested.

The Office Action rejected Claim 7 on the grounds that the phrase "the bonding step is plasma deposition" lacked antecedent basis and was unclear. In view of the modifications above, the rejection is believed overcome. Reconsideration is requested.

The Office Action rejected Claims 15 and 20 on the grounds that the claims cannot be both a product and a method. In view of the modifications above, reconsideration is requested. Claims 15 and 20 are product-by-process claims, which is an acceptable claim under U.S. law.

B. Rejections Under 35 USC 103

1. Rejection of Claims 1-2 under 35 U.S.C. 103 over EP 0834 594 (Nakagama).

The Office Action rejected Claims 1-2 under 35 U.S.C. 103 over EP 0834 594 (Nakagama). The rejection should be withdrawn in view of the remarks below.

To establish a *prima facie* case of obviousness, the USPTO must satisfy all of the following requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification must have had a reasonable expectation of success, as determined from the vantage point of one of ordinary skill in the art at the time the invention was made. *Amgen v. Chugai Pharmaceutical Co.* 18 USPQ 2d 1016, 1023 (Fed Cir, 1991), *cert. denied* 502 U.S. 856 (1991). Third, the prior art

reference or combination of references must teach or suggest all of the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496, (CCPA 1970).

Applicants' invention relates to a rejuvenated tantalum sputtering target comprising a used tantalum sputtering target having a tantalum sputtering plate and a backing plate. The target face of said tantalum sputtering plate includes one or more consumed surface area portions; and a mass of bonded metal particles within each of the one or more consumed surface area portions. The mass of bonded metal particles partially or completely fills each of said one or more consumed surface area portions, such that the tantalum sputtering target is (can be) rejuvenated without separating said backing plate from said tantalum sputtering plate. In one embodiment, the mass of bonded metal particles has microstructure substantially similar to said tantalum sputtering plate.

Nakagama teaches a process for producing sputtering targets that includes molding a mixture of powder of a high melting point substance having a melting point of 900 degrees celsius or above with a powder of a low-melting metal having a melting point of at least 700 degrees celsius or below at a temperature below the melting point of the low-melting metal under heat and pressure (See Abstract).

One of ordinary skill in the art following the teachings of Nakagama would not have been motivated to modify Nakagama and make Applicants' invention. Nakagama's products are fundamentally different from Applicants' invention. Nakagama's products made from molded mixtures are structurally different from Applicants' rejuvenated tantalum sputtering target requires a used tantalum sputtering target having a tantalum sputtering plate and a backing plate as well as the other limitations discussed above. There is simply no teaching in Nakagama that suggests Applicants' invention. Reconsideration is requested.

Not surprisingly, the sputtering targets encompassed by Applicants' invention and the sputtering targets made by the Nakagama process are made by two fundamentally different processes that produce different results. For instance, Nagakama requires the use of pressure. In Applicants' invention, the rejuventated targets can be made by placing or depositing sputter material and then subjecting the material to sintering or plasma deposition of sputter metal and sinter bonding

coupled with deposition (See Specification, page 2). In Applicants' invention, the rejunevated sputter target includes a fully dense coating (See page 2, paragraph 7). Nakagama does not teach that its bonded powder would be expected to be porous and give a poor film. Further, Nakagama does not teach a tantalum sputtering target that can be rejuvenated without separating said backing plate from said tantalum sputtering plate, as required by Applicants' invention. As such, one of ordinary skill in the art following the teachings of Nagakama would not have been motivated to modify Nakagama and make Applicants' invention. Reconsideration is requested.

2. Rejection of Claims 1-6, 8-13 and 15-24 Under 35 USC 103 Over DE 19925330 (Wollenberg) in view of Nakagama and WO/0031310 (Michaluk).

The rejection of Claims 1-6, 8-13 and 15-24 under 35 USC 103 over Wollenberg in view of Nakagama and Michaluk should also be withdrawn.

Applicants' invention relates to a rejuvenated tantalum sputtering target comprising a used tantalum sputtering target having a tantalum sputtering plate and a backing plate. The target face of the tantalum sputtering plate includes one or more consumed surface area portions; and a mass of bonded metal particles within each of the one or more consumed surface area portions. The mass of bonded metal particles partially or completely fills each of said one or more consumed surface area portions, such that the tantalum sputtering target can be rejuvenated without separating said backing plate from said tantalum sputtering plate. Applicants' invention also relates to the other embodiments as indicated above.

Wollenberg teaches a sputter target production or recycling process that involves covering a cast plate or worn target region with target material pieces or melt and then supplying heat from an IR emitter which is passed over the target material to effect melting and solification of the target material.

One of ordinary skill in the art folllowing the teachings of Wollenberg would not have been motivated by Nakagama and Michaluk, singly or in combination, to make of practice Applicants' invention. In Applicants' invention, the Applicants' rejuvenated target is made by a process that can incrementally add new metal powder into the consumed area. The rejuvenated part is fully dense. Wollenberg

does not selectively add new material into consumed area, i.e. no incremental addition. Due to the high melting point of Ta, Wollenburg teachings would be expected to result in an incomplete bond between new material and substrate and a degraded target. In other words, one of ordinary skill in the art following Wollenberg would not have expected the Wollenberg method to be successful.

Nakagama and Michaluk do not overcome the deficiencies of Wollenberg. Regardless, even if one of ordinary skill in the art following Wollenberg and familiar with Nakagama and Michaluk, the artisan would not have been motivated by these references as alleged in the Office Action. Michaluk's teachings, for instance, are directed to processes that produce an original target and not rejuvenating a used target. If one of ordinary skill in the art were to use Michaluk's teachings, the process would consist of melting the entire used target after removing the bonding plate and converting the used target into powder. Such teachings would have taught away from practicing Applicants' invention.

Similarly, Nakagama teachings of making a sputtering target that includes molding a mixture of powders having a high melting point substance having a melting point low-melting points would not have been suggestive of Applicants' invention. Reconsideration is requested.

Nakagama's products are fundamentally different from Applicants' invention. Nakagama's products made from molded mixtures are structurally different from Applicants' rejuvenated tantalum sputtering target requires a used tantalum sputtering target having a tantalum sputtering plate and a backing plate as well as the other limitations discussed above. The sputtering targets encompassed by Applicants' invention and the sputtering targets made by the Nakagama process are made by two fundamentally different processes that produce different results. Nakagama does not teach a tantalum sputtering target that can be rejuvenated without separating said backing plate from said tantalum sputtering plate, as required by Applicants' invention. There is simply no teaching in Nakagama that suggests Applicants' invention. Reconsideration is requested.

3. Rejection of Claim 7 Under 35 USC 103 Over Wollenberg in view of Nakagama and Michaluk as applied to claims 1-6, 8-13 and 15-24, and in further view of Japan 06-158300.

The rejection of Claim 7 under over Wollenberg in view of Nakagama and Michaluk in further view of Japan 06-158300 should also be withdrawn.

Applicants' invention, as encompassed by Claim 7, relates to a method to rejuvenate a consumed tantalum sputtering target comprising the step of: providing a used tantalum sputtering target having a tantalum sputtering plate and a backing plate, in which a target face of the tantalum sputtering plate includes one or more consumed surface area portions; filling each of one or more consumed surface area portions the powder of refractory metal to form filled portions; applying a high powered radiant energy beam locally to the filled portions to bond powder particles of the powder of refractory metal to each other and to each of one or more consumed surface area portions to form mass of bonded metal particles, such that the used tantalum sputtering target is (can be) rejuvenated without separating said backing plate from said tantalum sputtering plate. The high powered radiant beam is applied to bond powder particles by plasma deposition.

Japan 06-158300 teaches a process that involves laminating a high melting point metal on a high melting point metallic sheet by chemical vapor deposition (CVD) or laminating the high melting point metal in the consumed part of the target by CVD. A sintered compact having a high melting point is metal is hot-rolled into a sheet, the surface is cut, ground, and flattened, and then the surface is etched by a mixture (See Abstract). The sheet is cleaned with hot HCl, hot pure water, and acetone and used as the bottom sheet. A gaseous mixture is supplied on the sruface and a W layer is laminated by hydrogen-reduction CVD to produce a target (See Abstract).

Such teachings are not suggestive of Applicants' invention. One of ordinary skill in the art following Wollenberg would not have been motivated by Nakagama, Michaluk and Japan 06-158300 to modify Wollenberg and practice Applicants' invention. As discussed above, Michaluk would have taught away from the practicing

of Applicants' invention. Wollenberg, singly or combined with the teachings of Nakagama and Michaluk in Japan 06-158300 would not be suggestive of Applicants' invention. Reconsideration is requested.

4. Rejection of Claim 14 Under 35 USC 103 Over Wollenberg in view of Nakagama and Michaluk as applied to claims 1-6, 8-13 and 15-24, and in further view of U.S. Pat. No. 5,126,028 (Hurwit).

In view of the modifications above, the rejection under Claim 14 is moot.

5. Rejection of Claims 1-2 Under USC 103 Over Heindel (DE 19626732) in view of Michaluk (WO/ 00/031310

Applicants' invention, as encompassed by Claims 1 and 2, relates to a rejuvenated tantalum sputtering target comprising: a used tantalum sputtering target having a tantalum sputtering plate and a backing plate, in which a target face of said tantalum sputtering plate includes one or more consumed surface area portions; and a mass of bonded metal particles within each of the one or more consumed surface area portions, wherein said mass of bonded metal particles forms a fully dense coating that partially or completely fills each of said one or more consumed surface area portions. The used tantalum sputtering target is (can be) rejuvenated without separating said backing plate from said tantalum sputtering plate. In one embodiment, the mass of bonded metal particles has microstructure substantially similar to said tantalum sputtering plate.

Heindel teaches a sputtering target made of a metal or alloy which can be melted in air, and which has a liquidus temperature (TL) of below 500 degrees celsius, is melted by (a)heating a heating head (8)' to a temperature TM above TL and lowering it into the preferably initially solid target material (5, 20) to melt the material inthe region of the heating head; and (b) passing the heating head successively through the target material so that the solidification zone (25), formed behind the heating head, travels successively over the entire target region.The recycling process involves fillinq the eroded ta region with targetmaterial pieces or melt, and then carrying out step (b).

One of ordinary skill in the art following the teachings of Heindel, singly or in

combination with Michaluk, would not have been motivated to modify Heindel and make Applicants' invention.

Heindel teachings would not help in rejuvenating the refractory metal targets such as tantalum targets, because Heindel does not teach conditions that would enable the artisan to melt such targets. For instance, with respect to tantalum, due to the high melting point (3100^0 C) and chemical activity of tantalum above its melting point, Heindel does not teach a suitable material for the heat required to melt tantalum. Further, in Applicants' invention, no other material comes in contact with the target being rejuvenated.

Michaluk would not have motivated one of ordinary skill in the art following Heindel to modify Heindel and make Applicants' invention. Michaluk's teachings are for producing an original target, not rejuvenating a used target. If one were to use these teachings, the process would consist of melting the entire used target after removing the bonding plate and converting the used target into powder. Such teachings would have taught away from practicing Applicants' invention.

In view of the foregoing amendments and remarks, allowance of the pending claims is earnestly requested.

Respectfully submitted,

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